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10/625,315	07/23/2003	Francis James Kane JR.	10048-006	8385

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EXAMINER	
PRENDERGAST, ROBERTA D	

ART UNIT	PAPER NUMBER
2671	

DATE MAILED: 08/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/625,315	KANE, FRANCIS JAMES	
	Examiner	Art Unit	
	Roberta Prendergast	2671	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 July 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/31/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: Fig. 4 (elements 44 and 48) and Fig. 5 (element 56). Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 8-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 recites the limitation "...the color values of the 2D texture map;..." in line 6. There is insufficient antecedent basis for this limitation in the claim. The claim language is unclear as to how the 2D texture map being renderd/created at this point can be rendered using color values that do not actually exist until the map is rendered/created.

Claims 9-12 are dependent upon claim 8 and therefore the same rejection applies.

Claim 10 is further rejected because the claim does not state whether the second pass is performed in conjunction with the re-rendering step of claim 8 or in place of the re-rendering step. Further clarification is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4, 7, 13, and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Munshi et al. U.S. Patent No. 6469700.

Referring to claim 1, Munshi et al. teaches a method of providing a representation of an object in a computer graphics system: rendering a 3D computer graphic object to a 2D texture map (column 2, lines 10-25; column 5, lines 13-25); and creating a set of sequentially varying scaled resolution versions of the 2D texture map representative of the object at corresponding predetermined viewing distances (column 2, lines 35-57; column 4, lines 15-26; column 5, lines 25-47; column 6, lines 9-21).

Referring to claim 2, the rationale for claim 1 is incorporated herein, Munshi et al. teaches the method of claim 1, further comprising blending at least two sequentially adjacent versions to provide an anti-aliased representation of the object at a corresponding predetermined viewing distances (column 4, lines 15-26; columns 5-6, lines 41-41; column 7, lines 39-44).

Referring to claim 4, the rationale for claim 1 is incorporated herein, Munshi et al. teaches the method of claim 1, wherein blending further comprises trilinear filtering (column 4, lines 15-26; columns 5-6, lines 41-41; column 7, lines 39-44).

Referring to claim 7, the rationale for claim 1 is incorporated herein, Munshi et al. teaches applying at least one of the scaled resolution versions to a single polygon (column 1, lines 62-65; column 5, lines 4-13); and rendering the polygon to a display device (column 5, lines 13-21; column 8, lines 40-56).

Referring to claim 13, the rationale for claims 1 and 4 are incorporated herein, claim 13 recites the elements of claims 1 and 4 (i.e. the imposter is understood to be the

2D texture map of claim 1 and blending by utilizing trilinear filtering of the MIP maps provides an anti-aliased imposter) and therefore the same rejection applies.

Referring to claim 16, Munshi et al. teaches a computer graphics system comprising: a host computer; the computer graphics generator apparatus card comprising a rasterizer for rendering a 3D computer graphic object to a 2D texture map (Fig. 1 (element 60); column 4, lines 37-45), and a texture mapper for creating sequentially varying scaled resolution versions of the 2D texture map representative of the object at corresponding predetermined viewing distances (Fig. 2 (element 120); column 4, lines 45-61); and a host interface for coupling the computer graphics generator apparatus card to the host computer (Figs. 1 and 2 (element 40); column 4, lines 26-61).

Claim 15 is rejected under 35 U.S.C. 102(b) as being anticipated by Migdal et al. U.S. Patent No. 5760783.

Referring to claim 15, Migdal et al. teaches a computer graphics generator apparatus comprising; a rasterizer for rendering a 3D computer graphic object to a 2D texture map (Fig. 2 (element 224) and 10 (element 1030); i.e. scan conversion is understood to be rasterization; column 7, lines 7-10); and a texture mapper for creating sequentially varying scaled resolution versions of the 2D texture map representative of the object at corresponding predetermined viewing distances (Figs. 2 (element 226) and 9 (element 900); column 1, lines 45-67; column 7, lines 32-50).

Claims 1 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Fadden U.S. Patent No. 6002407.

Referring to claims 1 and 6, Fadden teaches the method of claim 1 comprising rendering a 3D computer graphic object to a 2D texture map; and creating a set of sequentially varying scaled resolution versions of the 2D texture map representative of the object at corresponding predetermined viewing distances (column 1, lines 35-50; column 2, lines 9-25; column 3, lines 9-14); and further comprising rendering the 3D computer graphic object to a 2D texture map at a resolution of 256 by 256 texels (column 1, lines 39-42).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Munshi et al. U.S. Patent No. 6469700 in view of Wilde U.S. Patent No. 5986663.

Referring to claim 5, the rationale for claim 1 is incorporated herein, Munshi et al. teaches the method of claim 1 but does not specifically teach rendering the 3D computer graphic object to a 2D texture map at a resolution greater than the resolution of the 3D computer graphic object.

Wilde teaches rendering the 3D computer graphic object to a 2D texture map at a resolution greater than the resolution of the 3D computer graphic object (column 8, lines 11-22 and 47-62, i.e. the original image is at a resolution of 256 by 256 texels, which is LOD2 and LOD0 is 1024 by 1024 texels and is used for those polygons that are close to the viewer and therefore require the maximum amount of detail).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Munshi et al. to include rendering the 3D computer graphic object to a 2D texture map at a resolution greater than the resolution of the 3D computer graphic object thereby providing higher quality images while increasing speed, efficiency, and realism (Abstract; column 3, lines 15-40; column 4, lines 1-18).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Munshi et al. U.S. Patent No. 6469700 in view of Migdal et al. U.S. Patent No. 5760783.

Referring to claim 3, the rationale for claim 1 is incorporated herein, Munshi et al. teaches the method of claim 3 but does not specifically teach wherein an updated representation of the object is provided when a viewing angle of the object changes or lighting on the object changes.

Migdal et al. teaches wherein an updated representation of the object is provided when a viewing angle of the object changes or lighting on the object changes (Figs. 8A and B; columns 7-8, lines 62-5; column 8, lines 21-35; column 10, lines 16-65).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Munshi et al. to include

wherein an updated representation of the object is provided when a viewing angle of the object changes or lighting on the object changes thereby providing textured images that can be rendered efficiently at real-time display speeds even when complex and voluminous source data is used (columns 2-3, lines 60-4; column 8, lines 2-5; column 10, lines 55-65) because user's demand that new views be displayed in real-time (column 10, lines 24-29).

Claims 8, 9 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Munshi et al. U.S. Patent No. 6469700 in view of Murphy U.S. Patent No. 6038031.

Referring to claim 8, the rationale for claim 1 is incorporated herein, Munshi et al. teaches the method of claim 1 but does not specifically teach wherein the step of rendering further comprises: internally rendering, in a first pass, the 3D computer graphic object to a 2D texture map using the color values and alpha values of the 3D computer graphic object, and the color values of the 2D texture map; and internally re-rendering the 3D computer graphic object to a 2D texture map to overwrite the alpha values rendered in the first pass, with corrected alpha values.

Murphy teaches wherein the step of rendering further comprises: internally rendering, in a first pass, the 3D computer graphic object to a 2D texture map using the color values and alpha values of the 3D computer graphic object, and the color values of the 2D texture map (column 6, lines 1-32; column 8, lines 4-10; column 9, lines 20-45, 49-53, and 55-62, i.e. the step of bilinear filtering to smooth "blocky" edges within an LOD is understood to be a first rendering pass); and internally re-rendering the 3D

computer graphic object to a 2D texture map to overwrite the alpha values rendered in the first pass, with corrected alpha values (column 6, lines 32-60; column 8, lines 14-21; column 9, lines 34, 44-45, 53-54, and 61-64, i.e. the step of trilinear filtering to smooth "blocky" edges between different LOD is considered to be a re-rendering pass).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Munshi et al. to include wherein the step of rendering further comprises: internally rendering, in a first pass, the 3D computer graphic object to a 2D texture map using the color values and alpha values of the 3D computer graphic object, and the color values of the 2D texture map thereby eliminating a border effect caused by including some of the key color, which should not be plotted, in the pixels that are valid for plotting during bilinear filtering (column 4, lines 55-65); and internally re-rendering the 3D computer graphic object to a 2D texture map to overwrite the alpha values rendered in the first pass, with corrected alpha values thereby providing a method for blending capabilities with increased transparency levels without significantly increasing hardware cost and complexity thereby reducing blocky edge effects in order to smooth the transition between the source and destination pixels (column 5, lines 1-23; column 6, lines 55-60).

Referring to claim 9, the rationale for claim 8 is incorporated herein, Munshi et al., as modified above, teaches the method of claim 8 but does not specifically teach wherein the method further comprises assigning an alpha value of zero (0) to the 2D texture map.

Murphy et al. teaches wherein the method further comprises assigning an alpha value of zero (0) to the 2D texture map (column 6, lines 3-19, i.e. it is understood that testing the color can result in every pixel of the 2D texture map being assigned an alpha value of zero (0)).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Munshi et al. to include wherein the method further comprises assigning an alpha value of zero (0) to the 2D texture map thereby eliminating any key color pixels and forcing the edge pixels to have an alpha value proportional to their distance from the body of the object thus reducing or eliminating the "blocky" edges (column 5, lines 14-23; column 6, lines 27-28 and 48-60).

Referring to claim 14, the rationale for claim 8 is incorporated herein, claim 14 recites the elements of claim 8 and therefore the same rejections apply.

Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Munshi et al. U.S. Patent No. 6469700 in view of Murphy U.S. Patent No. 6038031 as applied to claim 8 above, and further in view of Duluk, Jr. et al. U.S. Patent No. 6476807.

Referring to claim 10, the rationale for claim 8 is incorporated herein, Munshi et al., as modified above, teaches the method of claim 8 wherein MIP maps are used to store color images at multiple resolutions in a memory using an RGB color model and the MIP maps are rendered in a first pass and a second pass using a maximum function Rho and derivatives of the color values u, v and x,y (column 2, lines 35-67; columns 5-6, lines 26-67 and 1-35, i.e. creating MIP maps LOD and trilinear filtering between two

LOD) but does not specifically teach wherein the method further comprises: selecting maximum color values rendered in the first pass; and internally rendering, in a second pass, the 3D computer graphic object to a 2D texture map with the maximum color values.

Duluk, Jr. et al. teaches selecting maximum color values rendered in the first pass; and internally rendering, in a second pass, the 3D computer graphic object to a 2D texture map with the maximum color values (column 9, lines 45-64, i.e. for color testing two values, max and min, are provided; columns 10-11, lines 54-21, i.e. a maximum alpha blending function ($c= \max(C_s,C_d)$) is provided under OpenGL wherein each of the four R, G, B, A components of a source texel is blended with the corresponding component of a destination texel; column 14, lines 26-40, i.e. opaque geometry is rendered in a first pass and then transparent geometry is rendered in a second pass in spatial order resulting in more correct rendering; column 21, lines 25-31, alpha blending; column 27, lines 20-50, mip-mapping; columns 27-28, lines 61-19, i.e. alpha-blending is performed on pixels).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Munshi et al. to include selecting maximum color values rendered in the first pass; and internally rendering, in a second pass, the 3D computer graphic object to a 2D texture map with the maximum color values thereby providing an efficient blending equation with reduced complexity using OpenGL® standards (column 34, lines 43-49).

Referring to claim 11, the rationale for claim 10 is incorporated herein, Munshi et al., as modified by Duluk, Jr. et al. above, teaches the method of claim 10 wherein the maximum color value is selected according to the formula: C = MAX(Cs, Cd; where C represents the maximum color value drawn to each texel in the texture map, Cs represents the color value of the 3D computer graphic object, Cd represents the color value of the 2D texture map, and the function MAX determines the maximum of Cs and Cd, see rationale for claim 10 above.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Munshi et al. U.S. Patent No. 6469700 in view of Murphy U.S. Patent No. 6038031 as applied to claim 8 above, and further in view of Emberling et al. U.S. Patent No. 6246422.

Referring to claim 12, the rationale for claim 8 is incorporated herein, Munshi et al., as modified above, teaches the method of claim 8 but does not specifically teach wherein the step of internally rendering, in a first pass, is performed according to the formula: C = As*Cs +(1-As)*Cd; where C represents the final color drawn to the 2D texture map, As represents the alpha value corresponding to the 3D object, Cs represents the color value of the 3D computer graphic object, and Cd represents the color value of the 2D texture map.

Emberling et al. teaches wherein the step of internally rendering, in a first pass, is performed according to the formula: C = As*Cs +(1-As)*Cd (column 12, lines 28-); where C represents the final color drawn to the 2D texture map, As represents the alpha value corresponding to the 3D object, Cs represents the color value of the 3D computer graphic object, and Cd represents the color value of the 2D texture map.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Munshi et al. to include wherein the step of internally rendering, in a first pass, is performed according to the formula: C = As*Cs +(1-As)*Cd; where C represents the final color drawn to the 2D texture map, As represents the alpha value corresponding to the 3D object, Cs represents the color value of the 3D computer graphic object, and Cd represents the color value of the 2D texture map thereby providing a four channel merging option that can be used for translucent texture effects and for assigning different values to the alpha components in the texture map using OpenGL notation (Emberling: column 11, lines 38-41; column 12, lines 38-41).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following Non-Patent Literature is cited to further show the state of the art with respect to level of detail (LOD) texture mapping.

Loce et al. U. S. Patent No. 5689343

Pasco U. S. Patent No. 5745665

Choi U. S. Patent No. 5953015

Duluk, Jr. et al. U. S. Patent No. 6288730

Drebin et al. U. S. Patent No. 5877771

Redmann et al. U. S. Patent No. 5696892

Bishop et al. U. S. Patent No. 6424351

The following Non-Patent Literature is cited to further show the state of the art with respect to level of detail (LOD) texture mapping and alpha blending.

Lathrop et al. U. S. Patent No. 5097427

DeBry U. S. Patent No. 5838331

Augustine et al. U. S. Patent No. 5896136

Shaw et al. U. S. Patent No. 6259455

The following Non-Patent Literature is cited to further show the state of the art with respect to level of detail (LOD) texture mapping and updating changing views.

Rezk-Salama et al., "Interactive volume on standard PC graphics hardware using multi-textures and multi-stage rasterization", *Proc. of ACM SIGGRAPH/EUROGRAPHICS Workshop on Graphics Hardware* (Interlaken, Switzerland, August 21-22, 2000), ACM Press, NY, NY, pgs: 109-118.

Williams, L., "Pyramidal parametrics", *Proc. 10th Ann'l Conf. on Computer Graphics and Interactive Techniques* (Detroit, Mich., July 25-29, 1983), SIGGRAPH '83. ACM Press, New York, NY, pp. 1-11.

Tanner, C. C., Migdal, C. J., and Jones, M. T., "The clipmap: a virtual mipmap", *Proc. 25th Ann'l Conf. on Computer Graphics and Interactive Techniques* SIGGRAPH '98. ACM Press, New York, NY, pp. 151-158.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberta Prendergast whose telephone number is (571) 272-7647. The examiner can normally be reached on M-F 7:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on (571) 272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RP

ULKA J. CHAUHAN
PRIMARY EXAMINER